

**4WD-RCRA**

**MEMORANDUM**

SUBJ: Evaluation of Kerr-McGee Chemical Corporation's status  
under the RCRIS Corrective Action Environmental  
Indicator Event Codes (CA725 and CA750)  
EPA I.D. Number: MSD 990 866 329

FROM: Russ McLean, Environmental Engineer  
South Programs Section

THRU: Kent Williams, Chief  
South Programs Section

TO: Narindar Kumar, Chief  
RCRA Programs Branch

**I. PURPOSE OF MEMO**

This memo is written to formalize an evaluation of the Kerr-McGee Chemical Corporation, Forest Products Division's (Kerr-McGee), Columbus, Mississippi facility status in relation to the following RCRIS corrective action codes:

- 1) Human Exposures Controlled Determination (CA725),
- 2) Groundwater Releases Controlled Determination (CA750).

The applicability of these event codes adheres to the definitions and guidance provided by the Office of Solid Waste (OSW) in the July 29, 1994, memorandum to the Regional Waste Management Division Directors.

Concurrence by the RCRA Branch Chief is required prior to

entering these event codes into RCRIS. Your concurrence with the interpretations provided in the following paragraphs and the subsequent recommendations is satisfied by dating and signing above.

## II. HUMAN EXPOSURES CONTROLLED DETERMINATION (CA725)

There are three (3) national status codes under CA725. These status codes are:

- 1) YE Yes, applicable as of this date.
- 2) NA Previous determination no longer applicable as of this date.
- 3) NC No control measures necessary.

Region 4 has also added a regional status code to CA725 which tracks initial evaluations in which a determination is made that plausible human exposures to current contamination risks are not controlled. This regional status code is listed as "NO, not applicable as of this date." Use of the regional status code is only applicable during the first CA725 evaluation. Evaluations subsequent to the first evaluation will use the national status codes (i.e., YE, NA and NC) to explain the current status of exposure controls.

Note that the three national status codes for CA725 are based on the entire facility (i.e., the codes are not SWMU specific). Therefore, every area at the facility must meet the definition before a YE, NA or NC status code can be entered for CA725. Similarly, the regional status code, NO, is applicable if plausible human exposures are not controlled in any areas of the facility.

This particular CA725 evaluation is the **first evaluation** performed by EPA for the Kerr-McGee, Columbus, Mississippi

facility. Because assumptions have to be made as to whether or not human exposures to current media contamination are plausible and, if plausible, whether or not controls are in place to address these plausible exposures, this memo first examines each environmental media (i.e., soil, groundwater, surface water, air) at the entire facility including any offsite contamination emanating from the facility rather than from individual areas or releases. After this independent media by media examination is presented, a final recommendation is offered as to the proper CA725 status code for Kerr-McGee.

The following discussions, interpretations and conclusions on contamination and exposures at the facility are based on the following reference documents:

- " Draft RFI Report, March 1997
- " Phase II Off-Site Groundwater Assessment, April 1992
- " Groundwater Quality Assessment Report, February 1990
- " Semi-Annual Corrective Action Effectiveness Reports

### **III. MEDIA BY MEDIA DISCUSSION OF CONTAMINATION AND THE STATUS OF PLAUSIBLE HUMAN EXPOSURES**

#### **Background**

Kerr-McGee Chemical Corporation, Forest Products Division owns and operates a wood preserving facility in Columbus, Lowndes County, Mississippi. The site occupies approximately 90 acres and is surrounded by residential and industrial property. The facility has been in operation since 1928, manufacturing pressure treated railroad products including wooden crossties, switch ties and timbers. Kerr-McGee purchased the facility in 1964 from Moss American Corporation.

The production process utilizes creosote and creosote coal tar solutions to produce pressure treated railroad products. Pentachlorophenol was also used as a preservative until 1976.

The facility previously maintained an unlined surface impoundment, as part of the wastewater treatment system, to settle out solids and preservatives from the process waste water prior to final discharge to the city Publicly Owned Treatment Works (POTW). Preservative was removed and recycled back to the production process. The sludge generated in the impoundment is identified as the listed waste K001, bottom sediment sludges from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol.

On January 27, 1981 Kerr-McGee notified the Mississippi Department of Environmental Quality (MDEQ) and EPA of the operation of the impoundment. Groundwater monitoring was initiated in July 1981 in compliance with RCRA Part 265, Subpart F requirements. The impoundment was closed in the summer of 1986 in accordance with a closure plan approved by MDEQ.

A RCRA Part B permit application was submitted in March 1987 for post-closure care of the impoundment. In September 1987 Kerr-McGee notified MDEQ of the presence of dissolved creosote constituents in the downgradient monitor wells. A revised Part B application was submitted in April 1990, which included a proposal for the recovery of subsurface creosote product from the uppermost aquifer. The Post-Closure permit was issued to the facility on September 11, 1990. The HSWA portion of the RCRA permit was issued on August 1, 1995 and required the investigation of 15 SWMUs.

The facility has instituted several modifications to the production process in recent years designed to eliminate the potential for impact on the local environment. This includes upgrading the process oil/water separators, installation of a concrete drip track that meets Part 264, Subpart W standards and the installation of concrete containment systems for the tank farms. In conjunction with the upgrade of production processes, the facility has excavated visually impacted soils from the drip track, work tank and black tie storage areas.

## **Ground Water**

Releases from SWMUs have contaminated ground water at concentrations above relevant action levels. A ground-water quality assessment was conducted in 1988 following notification of groundwater constituents in the uppermost aquifer. This assessment was designed to fully delineate the horizontal and vertical extent of contamination, identify the hazardous constituents and their concentrations and propose corrective action for areas affected both on-site and off.

Underlying the facility are Quaternary age alluvial deposits consisting of interbedded clays, silts, sands and gravels that are generally coarser with depth. The thickness of the alluvium averages about 25 feet in the area of the Kerr-McGee facility. Underlying the alluvium is the Eutaw Formation which is composed of two members, the uppermost being the Tombigbee Sand and the lower referred to as "typical" Eutaw. The Tombigbee is a fine to medium grained, glauconitic, calcareous, massive sand. The lower "typical" Eutaw is less glauconitic sand with a slightly coarser texture, with associated clay layers. The Eutaw is a regional source of both industrial and domestic water supplies. In the area of the Columbus facility the Eutaw consists of finer grained material and is less permeable.

All groundwater use downgradient of the facility is from much deeper aquifers that have no hydraulic connection with the alluvial aquifer system. The corrective action system currently in place is effectively containing contaminated ground-water flow and mitigating constituent concentrations.

## **Alluvial Aquifer**

Groundwater investigations conducted at the facility have identified two separate constituent sources. The two product sources are the production process area in the southern part of the facility and the railcar loading and unloading area in the

black tie storage area on the eastern portion of the site. Constituent plumes are composed of both free creosote product and dissolved constituents. The free product contaminants in the production process area occur primarily in the erosional depressions of the Eutaw surface. The free product plume in the eastern half of the facility, associated with the railcar loading and unloading area, is at a shallower depth than the product in the production process area. This is possibly due to the contamination being from a younger source and/or the presence of fine silt lenses in this area restricting vertical migration. Figure 1 shows the location and extent of the plumes in the alluvial aquifer.

The groundwater contamination at the facility has been delineated and characterized by the installation of 80 groundwater monitoring wells and piezometers as well as 56 deep soil borings. Locations of the monitoring wells, piezometers and soil borings are depicted in Figure 2.

A corrective action program for recovery of the creosote contaminants in the alluvial aquifer was implemented in April 1990 with the installation of two product recovery wells in the process area. Another component of the groundwater recovery system at that time was the construction of an on-site hydraulic barrier to prevent further off-site migration of contaminants. This consisted of the installation of five recovery wells along the southwestern boundary of the facility.

In August 1992 the corrective action system was extended off-site with the construction of a trench and collection gallery system south of the production process area. An additional trench was constructed on-site in the black tie area. In addition to the collection sumps and hydraulic barrier recovery wells, seven product recovery wells have been installed in areas in which free product was encountered during past soil assessments. The ground-water recovery wells and collection trenches are concentrated in the erosional depressions of the

Eutaw Formation surface to maximize free product recovery. The locations of all recovery wells and the two trench systems are shown in Figure 2.

A total of 26 alluvial piezometers have been installed to measure the hydraulic drawdown created by the trenches and barrier recovery wells. A total of 45 alluvial monitoring wells have been installed to measure corrective action effectiveness through water level measurements and ground-water sample analysis. Samples are analyzed for all K001 constituents as well as benzene and xylene. A program is also in place for recovering free product which accumulates in the monitoring wells.

#### **Eutaw Aquifer**

The alluvium is unconformably underlain by the uppermost member of the Cretaceous-Age Eutaw Formation. In the vicinity of the Kerr-McGee facility the Eutaw is approximately 25 feet below ground surface, dipping in a southwesterly direction. A blue-green, glauconitic, micaceous, fine grained sand and silt section identifies the top of the Eutaw. Hydrogeologic information has been provided by the installation of eight Eutaw monitoring wells and one piezometer.

Initial ground-water sampling of the Eutaw detected no contamination of the aquifer by the constituents of concern. Subsequent sampling during the third and fourth quarters of 1989 indicated that the dissolved creosote constituents fluoranthene, phenanthrene, and 2,4-dimethylphenol were present in low but increasing levels in monitor well CME-1. It was concluded that free creosote product sitting on the surface of the Eutaw Formation, downgradient of the production process area, could only migrate into the Eutaw sediments if the existing pore water was displaced. Resisting this movement are the low vertical permeability of the Eutaw, the viscosity of the creosote and the capillary pressure between creosote and Eutaw pore water. It was determined that sampling of the Eutaw monitor wells required

large quantities of water to be removed in order to meet the requirement of removing three to five casing volumes of water prior to obtaining a groundwater sample. This displacement resulted in the localized migration of dissolved constituents into the monitoring well. A change in sampling protocol, requiring low flow sampling with sample retrieval after the stabilization of indicator parameters, appears to have eliminated this problem. Subsequent sample analyses have detected no creosote constituents in any of the Eutaw monitoring wells.

**Based on the above discussion, groundwater in the alluvial aquifer is contaminated and all plausible human exposures are controlled.**

#### **Surface Water**

The facility is located within the drainage basin of Luxapillila Creek, which is located 0.5 miles east of the facility. Luxapillila Creek is classified as a public water supply upstream of the facility. The downstream portion of the creek, down to the confluence with the Tombigbee Waterway System, is classified for fish and wildlife support and for incidental recreational use during the months of May through October.

Stormwater runoff from the facility is handled by a series of unlined ditches which flow into five permitted NPDES outfalls. Sediment sampling of the ditches at each NPDES discharge point identified carcinogenic PAH contamination generally two to three times above action levels. Subsequent TCLP sampling of these sediments were non detect for the same constituents indicating that the PAHs are highly adsorbed to the sediments with very low solubilities to water. Annual NPDES sampling for phenols and oil and grease indicates no gross impact to surface waters although, the detection limit for oil and grease analysis is 5 mg/l and action levels for the carcinogenic PAH constituents are much lower (MCL for Benzo(a)pyrene=.0002 mg/l).

Based on the above discussion, limited sampling of the surface water discharging from the facility does not indicate contamination above action levels. Further assessment of the surface water will be conducted in a Phase II RFI.

### Soil

Releases from SWMUs and AOCs have contaminated soil at concentrations above relevant action levels. During the RFI surficial soil and sediment sampling was conducted in the areas of the facility occupied by the wastewater treatment system, the cooling tower basin, the black tie storage area and the unlined drainage ditches. Sample analyses identified concentrations of carcinogenic PAHs up to three orders of magnitude above action levels and several samples exhibiting pentachlorophenol contamination an order of magnitude above the action level in all areas sampled.

Access to the property is controlled by a perimeter fence along all sides of the facility, except where the railroad tracks enter the facility on the east side. Directly west of these tracks is a creek which would act as a deterrent to anyone walking onto the property due to steep banks covered with a thicket of thorny brambles. The impacted soils within the facility boundary are covered by a 6-12 inch layer of gravel, preventing direct contact with the impacted soils and therefore eliminating the ingestion pathway. In addition, all facility personnel receive health and safety training to minimize their exposure to hazardous constituents.

Sediment sampling of the stormwater ditches, which drain the facility, indicate levels of carcinogenic PAH constituents two and three orders of magnitude above relevant action levels. These sediments are continually covered by water and no onsite exposure to the sediments is plausible. However, because of the high concentration of constituents at the facility boundary and no sampling conducted offsite, it is plausible that levels of

these constituents above action levels are present offsite. As the Luxapillila Creek is classified for fish and wildlife support and incidental recreational use downstream of the facility, human exposure to the sediments and possible bioaccumulation of constituents in aquatic organisms is plausible.

**Based on the above discussion, human exposures to contaminated soils/sediments are not controlled.**

#### **Air**

The levels of constituents in the surficial soils are above the levels for transfer to air, as set out in the Soil Screening Guidance and the Region 3 Risk Based Concentration table. This transfer to air represents a route-to-route extrapolation for each constituent in order to derive an inhalation benchmark. However, the soil screening levels calculated for the inhalation pathway for semi-volatile constituents, such as PAHs, is based on a particulate emission factor (PEF) and generation of fugitive dusts. As discussed above, impacted soils at the facility are covered by a 6 to 12 inch layer of gravel preventing the generation of fugitive dusts from these soils.

**Based on this discussion, there is no human exposure to contamination via an air route.**

#### **IV. STATUS CODE RECOMMENDATION FOR CA725:**

As discussed in Section III, human exposures to contamination of soils/sediments by creosote constituents (PAH) in the drainage ditches downstream of the facility are not controlled at the Kerr-McGee, Columbus, MS facility. Based on the information presented, it is recommended that **CA725 NO** be entered into RCRIS.

**V. GROUNDWATER RELEASES CONTROLLED DETERMINATION (CA750)**

There are three (3) status codes listed under CA750:

- 1) YE Yes, applicable as of this date.
- 2) NA Previous determination no longer applicable as of this date.
- 3) NR No releases to groundwater.

Region 4 has also added an additional status code which tracks the initial evaluations in which a determination is made that groundwater releases are not controlled. This regional status code is listed as "NO, not applicable as of this date." Use of the regional status code is only applicable in the first CA750 evaluation. Evaluations subsequent to the first evaluation will use the national status codes (i.e., YE, NA and NR) to explain the current status of groundwater control.

Note that the three national status codes for CA750 are designed to measure the adequacy of actively or passively (i.e., natural attenuation) controlling the physical movement of groundwater contaminated with hazardous constituents above relevant action levels. The designated boundary (e.g., the facility boundary, a line upgradient of receptors, the leading edge of the plume as defined by levels above action levels or cleanup standards, etc.) is the point where the success or failure of controlling the migration of hazardous constituents is measured. Every contaminated area at the facility must be evaluated and found to have the migration of contaminated groundwater controlled before a "YE" status code can be entered. Similarly, the regional status code is applicable if contaminated groundwater is not controlled in any area(s) of the facility.

This evaluation for CA750 is the first formal evaluation performed for the Kerr-McGee, Columbus, Mississippi facility.

Please note that CA750 is based on the adequate control of all contaminated groundwater at the facility.

The following discussions, interpretations and conclusions on contaminated ground water at the facility are based on the reference documents cited in Section II of this memorandum.

#### **VI. STATUS CODE RECOMMENDATION FOR CA750:**

Based on data contained in the documents referenced in Section II and summarized in the ground water portion of Section III, releases from SWMUs and AOCs have contaminated ground water at concentrations above relevant action levels.

Although the ground water is contaminated above relevant action levels, a system composed of ground-water recovery wells and collection trenches has been installed to contain and mitigate impacted ground water. It is recommended that **CA750 YE** be entered into RCRIS.

#### **VII. SUMMARY OF FOLLOW-UP ACTIONS**

Based on the results of sediment sampling of the onsite stormwater ditches conducted during the RFI, indicating PAH constituents above action levels, a Phase II RFI has been imposed on Kerr-McGee to delineate the extent of sediment contamination downstream of the facility. Additionally, sampling of the surface water in the ditches downstream of the facility and, if necessary, Luxapillila Creek will be conducted as part of this Phase II effort.